

AUG 7 1924

Book not to be
from the Library

DEPARTMENT OF COMMERCE

CIRCULAR

OF THE

BUREAU OF STANDARDS

No. 138

A DECIMAL CLASSIFICATION OF RADIO SUBJECTS—
AN EXTENSION OF THE DEWEY SYSTEM

MARCH 21, 1923



PRICE, 10 CENTS

Sold only by the Superintendent of Documents, Government Printing Office
Washington, D. C.

WASHINGTON
GOVERNMENT PRINTING OFFICE

1923

DEPARTMENT OF COMMERCE

CIRCULAR
OF THE
BUREAU OF STANDARDS

No. 138

A DECIMAL CLASSIFICATION OF RADIO SUBJECTS—
AN EXTENSION OF THE DEWEY SYSTEM

MARCH 21, 1923



PRICE, 10 CENTS

Sold only by the Superintendent of Documents, Government Printing Office
Washington, D. C.

WASHINGTON
GOVERNMENT PRINTING OFFICE

1923

A DECIMAL CLASSIFICATION OF RADIO SUBJECTS— AN EXTENSION OF THE DEWEY SYSTEM.

ABSTRACT.

Many workers in the growing field of radio communication have felt the necessity for a systematic scheme of classification which could be used for classifying and filing references to current radio literature as well as other radio material, such as drawings, books, and reports. Several years ago the radio laboratory of the Bureau of Standards felt the need for a such a classification in connection with its own work. After some trials it appeared that a decimal system of classification would be very useful for this purpose, thus giving a classification by subject in which the numbers used show not only the relative positions of the material in the files but also the subject matter. The whole subject of radio communication is put in its proper place in the Dewey decimal classification—621.384, but it is suggested that in a purely radio library these figures be abbreviated by the use of the letter "R" as a prefix for the numbers which designate the divisions of the subject—radio communication. The main headings into which the subject of radio are divided are as follows:

- R000 Radio communication.
- R100 Radio principles.
- R200 Radio measurements and standardization.
- R300 Radio apparatus and equipment.
- R400 Radio communication systems.
- R500 Applications of radio.
- R600 Radio stations: Equipment, operation, and management.
- R700 Radio manufacturing.
- (R800) Nonradio subjects.
- R900 Miscellaneous radio.

An abbreviated classification is provided for the use of small libraries or collections, and an alphabetical index enables one to refer readily to the classification number of any subject desired.

CONTENTS.

	Page.
I. Introduction	I
1. Need for classification	I
2. Extension of the Dewey decimal system of classification	2
3. Outline of classification	2
II. Summary of radio classification	3
1. Modifications and variations	3
2. Classification as to form	4
III. Abbreviated classification of radio subjects	5
IV. Complete table of class numbers	7
V. Acknowledgments	21
VI. Index to radio classification	21

I. INTRODUCTION.

1. NEED FOR CLASSIFICATION.

The radio laboratory of the Bureau of Standards has, in common with other workers in the radio field, felt the need for a systematic scheme of classification for subjects in radio science and engineer-

ing. This need has been felt not only for use in classifying the references to current radio publications but also for classifying other radio material, such as drawings, books, reports, etc. In an effort to fill the need for a radio classification the present extension of the Dewey decimal system has been prepared.

Such a system makes it easy to place books on related subjects near together on the shelves or to file references on the same subject all in the same group and not by the order of their addition to the collection or file. If a classification is to be of the most use any part of it must be capable of expansion, or it must be possible to disregard any part of the classification without interfering with the usefulness of the remaining parts.

2. EXTENSION OF THE DEWEY DECIMAL SYSTEM OF CLASSIFICATION.

Under the Dewey decimal system, of which the present classification is an extension, classification is by subject, numbers being used to show the relative positions of the books, cards, or other material. The numbers, therefore, show both what the material is (that is, its subject matter) and where the material is (that is, its location on the shelves or in the files). In the classification list the indentation and the figures prefixed to each item show the rank of each subject in the classification.

Accompanying the classification is an index which is arranged in the usual alphabetical order. References are made in this index to the subject classification number rather than to pages or to arbitrary shelf numbers. The index is used in determining the number to assign to a given item or material or to learn where to place it in the files. The index is also used by any person desiring to locate the material covering a given subject. The reference number tells him immediately where he will find all material on that and on related subjects.

3. OUTLINE OF CLASSIFICATION.

The whole subject of radio is put in its proper place in the Dewey classification—621.384. The relation of this place to the general field is shown by the following table:

Class	600.	Useful arts.
Division	20.	Engineering.
Section	1.	Mechanical.
	.300	Electrical.
	.080	Communication.
	.004	Radio.

In a strictly radio library or office it is convenient to represent the figure 621.384 by "R," and this abbreviation is used below in the further classification of radio. Thus—

R211 Resonance methods of measuring wave length.

R513 Applications of radio to fog signaling.

II. SUMMARY OF RADIO CLASSIFICATION.

Radio communication is divided into a general class and a number of other classes, as follows:

R000 Radio communication.

R100 Radio principles.

R200 Radio measurements and standardization.

R300 Radio apparatus and equipment.

R400 Radio communication systems.

R500 Applications of radio.

R600 Radio stations: Equipment, operation, and management.

R700 Radio manufacturing.

(R800) Nonradio subjects.

R900 Miscellaneous radio.

1. MODIFICATIONS AND VARIATIONS.

While some of the details of the Dewey system seem at the present time to be illogical (for example, electrical engineering a subdivision of mechanical engineering), the system has been widely adopted, and more confusion would result from attempting to change it into a more logical form than results from the arbitrary use of the established practice. In the present classification the Dewey system has been adopted and some of its general features are found specially advantageous. For example, all general material under a given class should be put under the class itself (frequently having a final figure 0). The ninth division under any class is frequently reserved for items which are as yet of too small importance to classify separately. This should not, however, be confused with the first item under each class which is used for general material applied to many or all of the subdivisions under it.

The class (R800) is left vacant for future use. However, in a strictly radio library or office having little material other than radio to classify, it will be found convenient to use this space for nonradio subject matter. Such material should be given its regular class number according to the Dewey system. If it were arranged in strictly numerical order, some of this material would come before radio and some after radio. But by choosing arbitrarily to use the space denoted by (R800) for this purpose it is

possible to arrange the nonradio material in classified order, but to keep it subordinate to a larger volume of radio material. Thus a number of nonradio items are listed under (R800) in the complete table of class numbers below.

For users having only a small amount of material to classify, an abbreviated classification is suggested. This abbreviated classification is given separately before the main table. Obviously, other items may be added or some of these omitted, depending on the individual needs.

Specific books or papers under a given class or subdivision may be denoted by a small letter, the assignment being according to subject, author, order of accession, or any other consideration depending on the circumstances

In a card file of references to periodical literature it is convenient to arrange the cards under each final class or subdivision in alphabetical order by the names of subjects or authors.

2. CLASSIFICATION AS TO FORM.

This classification is mainly by *subject* or *content*, regardless of form. For material covering a general field an additional form distinction is found practically useful. For classification as to form the following set of numbers may be used in connection with the number corresponding to the subject covered, in every case in which the number so formed has not already been employed for another signification.

The sequence of figures constituting the form number is simply placed to the right of the sequence of figures constituting the class number. If the class number already ends in one or two zeros, as 500 or 510, these zeros are disregarded in making up the combined number. Thus a periodical on any subject has the subject number followed by 05.

Examples:

- R504 Periodicals covering applications of radio.
- R510.4 Periodicals covering applications of radio to navigation.
- R512.04 Periodicals covering radio beacons.
- R512.007 Laws regarding radio beacons.

An example of the form classification is given in the complete table of class numbers under R620, Radio stations, operation and management.

- 001 Statistics.
- 002 Quantities; cost.
- 003 Contracts; specifications.

- 004 Designs; drawings.
- 005 Executive; administrative; rules.
- 006 Working; maintenance.
- 007 Laws; regulations.
- 008 Patents.
- 009 Reports of tests; bulletins.
- 01 Theory; methods; programs.
- 02 Textbooks; outlines; manuals.
- 03 Cyclopedias; dictionaries.
- 04 Essays; addresses; lectures; letters; papers.
- 05 Periodicals; magazines; reviews; bibliography; publications.
- 06 Societies; associations; transactions; exhibitions.
- 07 Education; training; museums.
- 08 Tables; calculations; charts; maps.
- 09 History; progress; development; biographical.
- Thus R470.9 History of development of wire radio systems.
- or R600.3 Contracts for radio stations.

III. ABBREVIATED CLASSIFICATION OF RADIO SUBJECTS.

For small collections or files in which detailed classification is not required, the following abbreviated list of classes may be useful:

- R000 **RADIO COMMUNICATION.**
- R050 -----Publications.
- R060 -----Societies.
- R090 -----History.
- R100 ----**Radio principles.**
- R110 -----Radio waves.
- R120 -----Antennas.
- R130 -----Electron tubes.
- R140 -----Radio circuits.
- R150 -----Generating apparatus.
- R160 -----Receiving apparatus.
- R190 -----Other radio principles.
- R200 ----**Radio measurements and standardization.**
- R210 -----Frequency; wave length.
- R220 -----Capacity; dielectric constant.
- R230 -----Inductance.
- R240 -----Resistance; decrement; phase difference; power loss.
- R250 -----Current.
- R260 -----Voltage.
- R270 -----Signal intensity.
- R280 -----Properties of materials.
- R290 -----Other measurements.
- R300 ----**Radio apparatus and equipment.**
- R320 -----Antennas.

- R330 -----Electron tubes.
- R340 -----Electron tube apparatus.
- R350 -----Generating apparatus; transmitting sets.
- R360 -----Receiving apparatus; receiving sets.
- R380 -----Parts of circuits; instruments.
- R400 -----**Radio communication systems.**
- R410 -----Modulated wave systems.
- R411 -----Spark.
- R412 -----Radio telephone systems.
- R413 -----Low-frequency modulating systems.
- R414 -----High-frequency modulating systems.
- R420 -----Continuous wave systems.
- R421 -----High-frequency alternator.
- R422 -----Arc.
- R423 -----Electron tube.
- R430 -----Interference elimination.
- R440 -----Remote control (by wire).
- R450 -----Linkage.
- R460 -----Duplex and multiplex systems.
- R470 -----Wired radio.
- R480 -----Relay systems.
- R490 -----Other systems.
- R500 -----**Applications of radio.**
- R510 -----Navigation.
- R520 -----Aviation.
- R530 -----Commercial and special services.
- R540 -----Private.
- R550 -----Broadcasting.
- R560 -----Military; naval.
- R570 -----Distant control by radio.
- R580 -----Other applications.
- R590 -----National developments.
- R600 -----**Radio stations: Equipment, operation, and management.**
- R610 -----Equipment; station descriptions.
- R620 -----Operation and management.
- R700 -----**Radio manufacturing.**
- R710 -----Factories.
- R720 -----Processes.
- R740 -----Sales.
- R800 -----**Nonradio subjects.**
- R900 -----**Miscellaneous radio**

IV. COMPLETE TABLE OF CLASS NUMBERS.

[The numbers marked with an asterisk (*) are not found in the Dewey decimal classification, but are inserted here for convenience.]

R000 RADIO COMMUNICATION.

- R001Statistics.
- R003Contracts.
- R004Design.
- R005Executive; administrative; personnel.
- R006
- R007Laws; Regulations.
- R007.1United States laws and regulations.
- R007.2United States radio inspection service.
- R007.3
- R007.4Canada.
- R007.5British Empire (except Canada).
- R007.6France.
- R007.7Germany.
- R007.8Other countries.
- R007.9International conferences.
- R008Patent specifications.
(These should ordinarily be distributed according to the subject of the patent.)
- R009Reports; bulletins.
- R010Research.
- R020Textbooks.
- R030Terminology; symbols.
- R040Lectures.
- R050Publications.
- R051Books.
- R053Periodicals.
- R055Bibliography.
- R060Societies; meetings.
- R070Education; training.
- R071Courses of study.
- R073Training of operators.
- R080Collections, tables, miscellanies.
- R081Tables.
- R082Nomograms.
- R083Humor.
- R084Maps and charts.
- R090History.
- R090.1United States.
- R090.2British Empire.
- R090.3France.
- R090.4Germany; Austria.

R090. 5	-----	Italy; Spain; Portugal.
R090. 6	-----	Norway; Sweden; Denmark.
R090. 7	-----	Asia; Africa.
R090. 8	-----	South America.
R090. 9	-----	Other countries.
R091	-----	Radio telegraphy.
R094	-----	Radio telephony.
R097	-----	Biographical.
R100	----	Radio principles.
R110	-----	Radio waves.
R111	-----	Electromagnetic theory.
R112. 1	-----	Radiation.
R112. 6	-----	Absorption (reception).
R113	-----	Transmission phenomena.
R113. 1	-----	Fading.
R113. 2	-----	Daily variations; seasonal variations.
R113. 3	-----	Directional variations.
R113. 4	-----	Ionization; Heaviside layer.
R113. 5	-----	Meteorological.
R113. 55	-----	Tropical radio.
R113. 6	-----	Reflection; refraction; diffraction.
R113. 7	-----	Transmission formulas; range.
R113. 8	-----	Eclipses.
R113. 9	-----	Wave front angle.
R114	-----	Strays.
R115	-----	Directional properties.
R116	-----	Waves on wires.
R120	----	Antennas.
R121	-----	Condenser type antennas (ordinary elevated type) with ground.
R122	-----	Condenser type antennas (ordinary elevated type) with counterpoise.
R123	-----	Ground and underground antennas.
R124	-----	Coil antennas.
R125. 1	-----	Direction finding.
R125. 6	-----	Directive antennas (transmitting in a particular di- rection).
R126	-----	Ground connections.
R127	-----	Antenna constants.
R128	-----	
R129	-----	Special types.
R130	----	Electron tubes.
R130. 3	-----	Nomenclature.
R130. 4	-----	Principles of design.
R131	-----	Characteristic curves; general properties.

R132	-----	Amplifying action.
R132. 1	-----	Inductive coupling.
R132. 2	-----	Capacitive coupling.
R132. 3	-----	Resistance coupling.
R133	-----	Generating action.
R134	-----	Detector action.
R134. 4	-----	Regenerative action.
R134. 45	-----	Superregenerative action.
R134. 5	-----	
R134. 6	-----	
R134. 7	-----	Heterodyne, autodyne.
R134. 75	-----	Superheterodyne.
R134. 8	-----	Reflex action.
R135	-----	Modulating action.
R136	-----	Input impedance.
R137	-----	Output impedance.
R138	-----	Electron emission; ionization.
R139	-----	Other electron tube principles.
R140	----	Radio circuits.
R141	----	Simple radio circuits.
R141. 1	----	Frequency.
R141. 2	----	Resonance.
R141. 3	----	Impulse excitation.
R142	----	Coupled circuits.
R142. 1	----	Direct coupling.
R142. 3	----	Inductive coupling.
R142. 5	----	Capacitive coupling.
R143	----	Damping; decrement.
R144	----	High-frequency resistance.
R145	----	Reactance.
R145. 3	----	Inductance.
R145. 5	----	Capacity.
R146	----	Harmonics.
R147	----	Beats.
R148	----	Modulation.
R148. 1	----	Distortion.
R149	----	Rectification.
R150	--	Generating apparatus.
R151	-----	
R152	-----	Spark gaps.
R153	-----	Arcs.
R154	-----	Alternators.
R155	-----	
R156	-----	Transformers.
R160	-----	Receiving apparatus.
R161	-----	Sensitivity.

R162	-----	Selectivity.
R170	-----	
R180	-----	
R190	-----	Other radio principles.
R200	-----	Radio measurements and standardization.
R201	-----	General methods and apparatus.
R201. 2	-----	Uses of electron tubes in radio measurements.
R201. 5	-----	Shielding and grounding.
R201. 6	-----	High-frequency bridge.
R201. 7	-----	Use of high-frequency oscillograph.
R202	-----	Resonance methods.
R203	-----	Harmonic methods.
R204	-----	Null methods.
R205	-----	Substitution methods.
R210	-----	Frequency; wave length.
R211	-----	Resonance methods.
R212	-----	
R213	-----	Harmonic methods.
R220	-----	Capacity.
R220. 1	-----	Capacity meters.
R223	-----	Dielectric constant.
R225	-----	Capacity of coils.
R230	-----	Inductance.
R231	-----	Self inductance.
R235	-----	Mutual inductance.
R240	-----	Resistance; decrement; phase difference; power loss.
R241	-----	Resistance-variation method.
R242	-----	Reactance-variation method.
R243	-----	Substitution method.
R244	-----	Calorimeter methods. (See also 536.6.)
R250	-----	Current.
R251	-----	Ammeters.
R251. 1	-----	Hot-wire.
R251. 2	-----	Thermoelement.
R251. 3	-----	Current transformer.
R251. 4	-----	Electrodynamometer.
R251. 5	-----	Einthoven galvanometer.
R251. 6	-----	Bolometer bridge.
R260	-----	Voltage.
R261	-----	Electron tube voltmeters.
R262	-----	Sparking distance.
R263	-----	Electrostatic voltmeters.
R264	-----	
R265	-----	
R266	-----	

R267	-----
R268	-----
R269	----- Other voltmeters for radio frequencies.
R270	----- Signal intensity.
R271	----- Shunted telephone method.
R272	----- Audio-frequency comparison method.
R273	----- Radio-frequency comparison method.
R274	-----
R275	----- Modulation.
R280	----- Properties of materials.
R281	----- Electrical insulating materials.
R281. 1	----- Laminated.
R281. 11	----- Phenolic binders.
R281. 12	----- Shellac binders.
R281. 13	----- Fiber.
R281. 2	----- Molded.
R281. 21	----- Phenolic binders.
R281. 22	----- Shellac binders.
R281. 23	----- Pitch binders.
R281. 31	----- Porcelain.
R281. 33	----- Glass.
R281. 35	----- Rubber.
R281. 37	----- Gutta-percha.
R281. 38	----- Mica.
R281. 383	----- Built-up mica.
R281. 41	----- Textiles.
R281. 42	----- Paper.
R281. 426	----- Pulpboard.
R281. 43	----- Wood.
R281. 44	----- Wax.
R281. 45	----- Pitch.
R281. 46	----- Paraffin.
R281. 47	----- Varnish.
R281. 48	----- Shellac.
R281. 49	----- Oil.
R281. 60	----- Resins.
R281. 61	----- Natural resins.
R281. 65	----- Synthetic resins.
R281. 70	-----
R281. 71	----- Quartz.
R281. 72	----- Marble.
R281. 73	----- Granite.
R281. 74	----- Slate.
R281. 75	----- Lava.
R281. 76	----- Asbestos.

R281. 77	.....	Sulphur.
R281. 78	.....	Amber.
R281. 79	.....	Celluloid.
R281. 80	.....	Cellulose esters.
R281. 81	.....	Oxide coatings.
R281. 82	.....	Vitrified clay products.
R281. 83	.....	Casein products.
R281. 9	.....	Miscellaneous insulating materials.
R282	.....	Electrolytes.
R283	.....	Magnetic materials.
R284	.....	Conductors.
R284. 1	.....	Metals.
R284. 11	.....	Copper.
R284. 13	.....	Tungsten.
R284. 3	.....	Pyroelectric.
R290	.....	Other measurements.
R300	.....	Radio apparatus and equipment.
R300. 4	.....	Design.
R300. 5	.....	Engineering precautions.
R300. 6	.....	Kick-back prevention.
R301	.....	
R302	.....	
R303	.....	
R304	.....	
R305	.....	Photographs of radio apparatus.
R306	.....	Exhibitions.
R307	.....	Laboratories.
R308	.....	Stockrooms.
R310	.....	
R320	.....	Antennas.
R320. 6	.....	Antenna switches.
R320. 8	.....	Towers.
R321	.....	Condenser type antennas (ordinary elevated type) with ground.
R322	.....	Condenser type antennas (ordinary elevated type) with counterpoise.
R323	.....	Ground and underground antennas.
R324	.....	Coil antennas.
R325. 1	.....	Direction finders.
R325. 6	.....	Directive antennas (transmitting in a particular direction).
R326	.....	Ground connections.
R327	.....	Artificial antennas.
R328	.....	Multiple-tuned antennas.

- R329Special types of antennas. (For airplane antennas
see R525.)
- R330Electron tubes.
- R330. 4Design.
- R330. 6Priority; controversial.
- R330. 9History.
- R331Construction; evacuation. (*See also* Vacuum
pumps, 533.85.)
- R332Two-electrode.
- R332. 3Regulator tubes.
- R333Three-electrode.
- R334Four-electrode.
- R340Electron tube apparatus.
- R341Detectors; rectifiers.
- R342Amplifiers.
- R342. 1Inductive coupling.
- R342. 15.....Amplifier transformer.
- R342. 2Resistance coupling.
- R342. 3Capacitive coupling.
- R342. 4
- R342. 5Power amplifier.
- R342. 6Radio-frequency amplifiers.
- R342. 7Audio-frequency amplifiers.
- R343Electron tube receiving sets.
- R343. 5Heterodyne sets.
- R343. 7Alternating-current supply.
- R344Electron tube generators.
- R344. 3Transmitting sets.
- R344. 4Short-wave generators.
- R344. 5Alternating-current supply.
- R344. 6Large-current generators.
- R344. 7Harmonic generators; multivibrators.
- R345Modulators.
- R346Radio telephone sets (electron tube).
- R347
- R348Use in wire systems.
- R350Generating apparatus; transmitting sets.
- R351Simple oscillators.
- R352Spark gaps. (*See also* R411.)
- R352. 2Quenched.
- R352. 4Rotary, synchronous.
- R352. 6Rotary, nonsynchronous.
- R352. 8Timed spark.
- R353Arc converters. (*See also* R422.)
- R354High-frequency alternators. (*See also* R421.)

R355	.....	High-voltage generators.
R356	.....	Transformers.
R356. 3	.....	Resonance transformers.
R356. 5	.....	Induction coils.
R357	.....	Frequency changers.
R358	.....	Protective devices.
R359	.....	Automatic transmitters.
R360	.....	Receiving sets.
R370	.....	Receiving apparatus.
R371	.....	
R372	.....	
R373	.....	Amplifiers. (For electron-tube amplifiers see R342.)
R373. 1	.....	Magnetic.
R373. 2	.....	Microphone.
R374	.....	Detectors, crystal. (For electron-tube detectors see R341.)
R374. 1	.....	Theory.
R374. 2	.....	Practical form.
R374. 3	.....	Balanced crystals.
R375	.....	Detectors and rectifiers; miscellaneous.
R375. 1	.....	Magnetic.
R375. 2	.....	Coherer.
R375. 3	.....	Electrolytic.
R376	.....	Telephone receivers.
R376. 2	.....	Tuned.
R376. 3	.....	Loud-speaking reproducers.
R377	.....	Automatic recorders.
R377. 1	.....	Photographic recorder.
R377. 2	.....	Jet relay.
R377. 3	.....	Electromagnetic recorder.
R377. 4	.....	Telegraphone.
R377. 5	.....	Phonograph recorder.
R377. 6	.....	Automatic printing recorder. (<i>See also</i> R487.)
R378	.....	Audibility meters.
R380	.....	Parts of circuits; instruments.
R381	.....	Condensers.
R382	.....	Inductors.
R382. 4	.....	Cellular coils.
R382. 5	.....	Couplers; oscillation transformers.
R382. 6	.....	Spiderweb coils.
R383	.....	Resistors.
R383. 1	.....	Grid leaks.
R384. 1	.....	Wavemeters.
R384. 3	.....	Frequency meters.
R384. 5	.....	Decremeters.

- R385. 1 ----- Keys.
- R385. 2 ----- Buzzers.
- R385. 3 ----- Interrupters; tone wheels; choppers. (*See also*
R427.)
- R385. 5 ----- Microphone.
- R386 ----- Filters.
- R387. 1 ----- Shields.
- R387. 5 ----- Grounds. .
- R387. 7 ----- Insulators.
- R388 ----- Cathode-ray oscillograph.
- R390 -----
- R400 ----- **Radio communication systems.**
- R401 ----- High Power.
- R402 ----- Short wave.
- R410 ----- Modulated wave systems.
- R411 ----- Spark.
- R411. 2 ----- Quenched.
- R411. 4 ----- Rotary, synchronous.
- R411. 6 ----- Rotary, nonsynchronous.
- R411. 9 ----- Other spark systems.
- R412 ----- Radio telephone systems.
- R413 ----- Low-frequency modulating systems.
- R414 ----- High-frequency modulating systems.
- R420 ----- Continuous-wave systems.
- R421 ----- High-frequency alternator.
- R422 ----- Arc.
- R422. 1 ----- Spacing wave.
- R423 ----- Electron tube. (*Preferably use other more spe-*
cific entries.)
- R424 ----- Timed spark.
- R425 ----- Impulse excitation.
- R426 ----- Beat reception.
- R427 ----- Use of receiving interrupters and tone wheels.
- R428 -----
- R429 ----- Other methods of continuous wave reception.
- R430 ----- Interference elimination. (*See also* R386, filters.)
- R431 ----- Strays.
- R432 ----- Stations.
- R433 -----
- R434 -----
- R435 ----- Secrecy systems.
- R440 ----- Remote control (by wire).
- R450 ----- Linkage.
- R460 ----- Duplex and multiplex systems.

R470	-----	Wire radio.
R480	-----	Relay systems.
R485	-----	High-speed systems.
R487	-----	Automatic printing system.
R490	-----	Other systems.
R491	-----	
R492	-----	Buzzerphone.
R493	-----	Fullerphone.
R494	-----	
R495	-----	Tree telegraphy.
R500	-----	Applications of radio.
R510	-----	Navigation.
R511	-----	Distress signals.
R512	-----	Radio beacons.
R513	-----	Fog signaling.
R514	-----	Radio compass.
R515	-----	Submarine.
R516	-----	Life-saving service.
R520	-----	Aviation.
R520. 3	-----	Radio telephony on aircraft.
R521	-----	Receiving on aircraft.
R521. 1	-----	Direction finding.
R521. 3	-----	Elimination of magneto interference.
R521. 5	-----	Helmets for telephone receivers.
R522	-----	Transmitting from aircraft.
R522. 3	-----	Microphone design.
R523	-----	Receiving from aircraft.
R524	-----	Transmitting to aircraft.
R524. 3	-----	Localized landing signals.
R525	-----	Antennas.
R530	-----	Commercial and special services.
R531	-----	Traffic.
R531. 1	-----	Codes and ciphers.
R531. 15	-----	Speed of code reception.
R531. 2	-----	Station call letters.
R531. 3	-----	Abbreviations.
R531. 4	-----	Alphabets, Morse and continental (international).
R531. 5	-----	Relations with land lines.
R531. 6	-----	Relations with cables.
R531. 7	-----	Rates.
R532	-----	Press.
R533	-----	Railroad.
R534	-----	Agriculture.
R535	-----	Forestry.

- R536Mining.
- R537Power transmission lines.
- R540Private.
- R541
- R542
- R545Amateur.
- R550Broadcasting.
- R551Time signals.
- R551. 1Longitude determinations.
- R552
- R553Meteorological signals.
- R554
- R555Standard waves.
- R556Market reports.
- R560Military.
- R565Naval.
- R570Distant control by radio.
- R580Other applications.
- R581Transmission of power by radio.
- R582Transmission of photographs.
- R583Therapeutics.
- R584High-frequency electric furnaces.
- R585Radio toys.
- R590National developments.
- R591United States.
- R592British Empire.
- R593France.
- R594Germany.
- R595Italy; Spain; Portugal.
- R596Norway; Sweden; Denmark.
- R597Asia; Africa.
- R598South America.
- R599Other countries.
- R600Radio stations: Equipment, operation, and manage-
ment.
- R610Equipment; station descriptions.
- R611Long-wave stations.
- R612Short-wave stations.
- R613Ship stations.
- R614Direction finding stations.
- R620Operation and management.
- R620. 01.....Statistics.
- R620. 02.....Costs.
- R620. 03.....Contracts.
- R620. 04.....Drawings.

- R620. 05 Administrative; executive.
- R620. 06 Working and maintenance.
- R620. 063 Personnel.
- R620. 064 Operating routine—Schedules of transmission.
- R620. 065 Regulation and control.
- R620. 068 Testing.
- R620. 069 Repairs and renewals. (General.—A specific
repair belongs with the part repaired.)
- R620. 07 Regulations; rules.
- R620. 08 Installation.
- R620. 09 Reports and bulletins.
- R700 **Radio manufacturing.**
- R700. 1 Statistics.
- R700. 2 Costs.
- R700. 3 Contracts.
- R700. 4 Drawings.
- R700. 5 Administrative; executive.
- R700. 6 Operation and maintenance.
- R700. 69 Repairs and renewals.
- R700. 7 Regulations; rules.
- R701 Materials and equipment (sources, etc.).
- R701. 2 Raw materials.
- R701. 4 Tools; machines.
- R710 Factories.
- R710. 1 Location.
- R710. 4 Organization; administration.
- R710. 5 Mechanics and laborers.
- R711 Drafting.
- R712 Woodworking shop.
- R713 Machine shop.
- R719 Other shops and departments.
- R720 Processes.
- R730
- R740 Sales.
- R741
- R742
- R743
- R744 Advertising.
- (R800) **Nonradio subjects.**
- 347. 7 Patent practice.
- 353. 821* Bureau of Standards.
- 383 Postal service, Aerial mail service. (*See also*
Aeronautics, 629.13.)
- 510 Mathematics.
- 510. 8 Slide rules.

511	.....	Arithmetic.
512	.....	Algebra.
512. 82	.....	Complex variables; imaginaries.
513	.....	Geometry.
514	.....	Trigonometry.
515	.....	Descriptive geometry.
516	.....	Analytic geometry.
516. 12*	.....	Nomography; graphical methods.
517	.....	Calculus.
519	.....	Probabilities.
520	.....	Astronomy.
526	.....	Geodesy.
526. 8	.....	Map projections.
530	.....	Physics.
531	.....	Mechanics.
532	.....	Hydrostatics.
533	.....	Pneumatics.
533. 85	.....	Vacuum apparatus.
534	.....	Sound.
534. 3	.....	Tuning forks.
534. 83	.....	Signals in navigation.
535	.....	Light. (For Light signaling see 623.731.)
535. 3	.....	Photo-electric phenomena.
536	.....	Heat.
536. 33	.....	Radiation; general theory.
537	.....	Electricity.
537. 1	.....	Theory of electricity.
537. 23	.....	Electrostatic generators.
537. 26*	.....	Corona discharge.
537. 4	.....	Lightning.
537. 6	.....	Electrodynamics.
537. 61*	.....	Negative resistance.
537. 63*	.....	Corbino effect.
537. 65*	.....	Piezoelectric phenomena.
537. 66*	.....	Electric adhesion phenomena.
537. 67*	.....	Experimental plotting of electrical fields.
537. 7	.....	Wave form analysis.
537. 87	.....	Physiological electrical phenomena.
538	.....	Magnetism.
539	.....	Molecular physics.
540	.....	Chemistry.
541. 3	.....	Physical chemistry.
546. 432	.....	Radioactivity.
550	.....	Geology.
551. 5	.....	Weather; meteorology.

621	.....	Mechanical engineering.
621. 3	.....	Electrical engineering.
621. 313	.....	Electric generators; electric motors.
621. 313. 2	.....	Direct-current machinery.
621. 313. 23	.....	Direct-current generators.
621. 313. 24	.....	Direct-current motors.
621. 313. 25	.....	Motor-generators.
621. 313. 26	.....	Dynamotors.
621. 313. 3	.....	Alternating-current machinery.
621. 313. 7	.....	Rectifiers.
621. 313. 73	.....	Mercury-vapor rectifiers.
621. 314. 3	.....	Transformers.
621. 314. 6	.....	Choke coils.
621. 314. 7	.....	Induction coils.
621. 317	.....	Switchboards.
621. 317. 3	.....	Switches.
621. 317. 4	.....	Rheostats.
621. 319. 2	.....	Transmission lines.
621. 325	.....	Incandescent arcs.
621. 326	.....	Incandescent filament lamps.
621. 327. 4	.....	Mercury vapor tubes (lamps).
621. 327. 7	.....	X-ray tubes.
621. 353	.....	Batteries, primary.
621. 354	.....	Batteries, secondary (storage).
621. 354. 3*	.....	Battery charging devices.
621. 374. 2	.....	Wheatstone bridges.
621. 374. 3	.....	Voltmeters.
621. 374. 33*	.....	Electrometers.
621. 374. 41*	.....	Ammeters.
621. 374. 45*	.....	Galvanometers.
621. 374. 6	.....	Wattmeters.
621. 374. 63*	.....	Electrodynamometers.
621. 374. 7	.....	Oscillographs.
621. 38	.....	Electric communication.
621. 382	.....	Telegraphy.
621. 382. 4	.....	High-speed telegraphy.
621. 382. 8	.....	Submarine cable.
621. 382. 92*	.....	Ground telegraphy.
621. 382. 94	.....	Induction signaling.
621. 383. 21	.....	Relays.
621. 385	.....	Telephony.
621. 385. 91*	.....	Telegraphone.
621. 385. 93*	.....	Thermophone.
621. 385. 95*	.....	Condenser transmitters.
621. 39	.....	Other applications of electricity.

623. 731	-----	Light signals.
623. 8	-----	Steamships.
629. 13	-----	Aeronautics.
629. 145	-----	Aerial navigation.
629. 18	-----	Airplane construction.
658	-----	Business methods.
R900	-----	Miscellaneous.

V. ACKNOWLEDGMENTS.

The general scheme used in the above classification follows the decimal classification and relative index of Melvil Dewey, published by the Forest Press, Lake Placid, N. Y. An extension of the Dewey decimal system of classification applied to engineering industries by L. P. Breckenridge and G. A. Goodenough has been issued by the University of Illinois Engineering Experiment Station as Bulletin No. 9 (1912). Both the Dewey classification and the University of Illinois extension give a short classification of radio communication, but the recent advances in this subject have caused it to outgrow these limitations. Valuable criticism of a preliminary radio subject classification have been received from Arthur Bessey Smith and Harrison W. Craver, and it is partly owing to their recommendation and to the widespread use of the Dewey system that the decimal classification has been adopted. Attention is also called to a "Proposed classification for an engineering library" published in the Transactions of the American Society of Civil Engineers, volume 82, page 1618, December, 1918. The classification there proposed is decimal in form but departs quite radically from the Dewey system. The classification of radio there is very meager.

VI. INDEX TO RADIO CLASSIFICATION.

To use this index, find the subject desired in its alphabetical place in the following list. The number after it is its class number, and refers to the place where the topic will be found, in numerical order of class numbers, on the shelves or in the subject catalogs.

All class numbers are decimals; that is, R251.1, Hot-wire ammeters, comes before R260, Voltage measurements. Labels on the shelves, drawer fronts, or cards guide readily to the class number sought.

Under this class number will be found the resources of the library on the subject desired. Other subjects near the one sought may often be consulted with profit; for example, Electron tubes

is the topic wanted and the index refers to R330, but R340, Electron-tube apparatus, also contains much on the subject of electron tubes, as well.

The numbers which are not preceded by the letter "R" are for the nonradio subjects and are grouped under the heading (R800) in the above classification.

A.

- Abacs, radio, R080.
- Abacs, theory, 516.12.
- Abbreviations, radio traffic, R531.3.
- Absorption (reception of electric waves), R112.6.
- Absorption factor (transmission), R113.
- Adhesion phenomena, electric, 537.66.
- Administration, radio factories, R710.4.
- Administrative, radio, R005.
- Administrative, radio manufacturing, R700.5.
- Administrative, station operation, R620.5.
- Advertising, radio manufacturing, R744.
- Aerial mail service, 383.
- Aerial navigation, 629.145.
- Aerials. (*See* Antennas.)
- Aeronautics, 629.13.
- Aeronautics, applications of radio to, R520.
- Agriculture, use of radio in, R534.
- Air, dielectric strength of, R262.
- Air service, radio (military), R560.
- Aircraft, applications of radio to, R520.
- Aircraft, receiving on, R521.
- Airplane construction, 629.18.
- Alexanderson alternator, R354.
- Algebra, 512.
- Alphabets, Morse and continental, R531.4.
- Alternating-current machinery, 621.313.3.
- Alternating-current supply to electron-tube generators, R344.5.
- Alternating-current supply to electron-tube receiving sets, R343.7.
- Alternator, high-frequency (principles), R154.
- Alternator, high-frequency, systems, R421.
- Alternators, high-frequency, R354.
- Amateur radio, R545.
- Amber, R281.78.
- Ammeters, 621.374.41.
- Ammeters, hot-wire, R251.1.
- Ammeters, radio, R251.
- Amplification of electron tubes, R132.
- Amplifiers (for Electron-tube amplifiers *see* R342), R373.
- Amplifiers, electron-tube, R342.
- Amplifiers, electron-tube (principles), R132.
- Amplifiers, electron-tube, use in wire communication, R348.
- Amplifiers, power, R342.5.
- Amplifier transformer, R342.15.
- Amplifying action of electron tubes, R132.
- Analysis of wave forms, 537.7.
- Analytic geometry, 515.
- Angle of wave front, R113.9.
- Antenna constants (principles), R127.
- Antenna switches, R320.6.
- Antennas, R320.
- Antennas (principles), R120.
- Antennas, airplane, R525.
- Antennas, artificial, R327.
- Antennas, coil, R324.
- Antennas, coil (principles), R124.
- Antennas, condenser type, with counterpoise, R322.
- Antennas, condenser type, with counterpoise (principles), R122.
- Antennas, condenser type, with ground, R321.
- Antennas, condenser type, with ground (principles), R121.
- Antennas, counterpoise, R322.
- Antennas, counterpoise (principles), R122.
- Antennas, directive, R325.6.
- Antennas, directive (principles), R125.6.
- Antennas, elevated, with counterpoise, R322.
- Antennas, elevated, with counterpoise (principles), R122.
- Antennas, elevated, with ground, R321.
- Antennas, elevated, with ground (principles), R121.
- Antennas, ground, R323.

Antennas, ground (principles), R123.
 Antennas, multiple-tuned, R328.
 Antennas on aircraft, R525.
 Antennas, special types, R329.
 Antennas, special types (principles), R129.
 Antennas, underground, R323.
 Antennas, underground (principles), R123.
 Apparatus, electron-tube, R340.
 Apparatus, radio, R300.
 Apparatus, receiving, R370.
 Apparatus, transmitting, R350.
 Applications, radio, R500.
 Arc converters, R353.
 Arc (principles), R153.
 Arc systems, R422.
 Arcs, incandescent, 621.325.
 Arithmetic, 511.
 Artificial antennas, R327.
 Asbestos, R281.76.
 Astronomy, 520.
 Atmosphere (radio transmission), R113.4.
 Atmospherics (radio transmission), R114.
 Atmospherics, elimination of, R431.
 Audibility, measurement of, R270.
 Audibility meters, R378.
 Audio-frequency amplifiers, R342.7.
 Audions, R330.
 Autodyne, action, electron tubes (principles), R134.5.
 Autodyne reception systems, R426.
 Automatic printing systems, R487.
 Automatic recorders, R377.
 Automatic transmitters, R359.
 Aviation, applications of radio to, R520.

B.

Bakelite, insulating materials, laminated, R281.11.
 Bakelite, insulating materials, moulded, R281.21.
 Balanced crystals, R374.3.
 Balloon, uses of radio on, R520.
 Batteries, primary, 621.353.
 Batteries, secondary, 621.354.
 Battery charging devices, 621.354.3.
 Beacons, radio, R512.
 Beats, radio (general principles), R147.
 Beat reception systems, R426.
 Bibliography, R055.
 Biographical, radio, R097.
 Bolometer bridge, R251.6.
 Books, R051.

Braun tube, R388.
 Bridge, bolometer, R251.6.
 Bridge, high-frequency, R201.6.
 Bridge, Wheatstone, 621.374.2.
 British Empire, radio developments, R592.
 Broadcasting by radio, R550.
 Bulletins of radio stations, R620.9.
 Bulletins, radio, R009.
 Bureau of Standards, 353.821.
 Business methods, 658.
 Buzzerphone, R492.
 Buzzers, R385.2.

C.

Cables, relations with, R531.6.
 Cables, submarine, 621.382.8.
 Calculus, 517.
 Call letters, station, R531.2.
 Calorimeter method of measuring resistance, R244.
 Cambric, varnished, R281.41.
 Canada, radio laws and regulations, R007.4.
 Capacitance. (*See* Capacity.)
 Capacitive coupling, amplifiers, R342.3.
 Capacitive coupling (general principles), R142.5.
 Capacity, measurement, R220.
 Capacity meters, R220.1.
 Capacity of antennas (principles), R127.
 Capacity of coils, measurement, R225.
 Capacity, radio circuits (principles), R145.5.
 Carborundum detector, R364.
 Carrier-frequency telephony, R470.
 Casein products (insulating materials), R281.83.
 Cathode, incandescent, emission of electrons from, R138.
 Cathode-ray oscillograph, R388.
 Cellular inductance coils, R382.4.
 Celluloid, R281.79.
 Cellulose esters, R281.80.
 Characteristic curves of electron tubes, R131.
 Charging devices, battery, 621.354.3.
 Charts, R084.
 Chemistry, 540.
 Choke coils, 621.314.6.
 Choppers (descriptions), R385.3.
 Choppers, use of, R427.
 Cipher, R531.1.
 Circuits, radio, R140.
 Classifications, R055.

- Clay, vitrified, products (insulating materials), R281.82.
 Codes and ciphers, R531.1.
 Codes, Morse and continental, R531.4.
 Cohers, R375.2.
 Coil antennas, R324.
 Coil antennas (principles), R124.
 Coil, inductance, R382.
 Coils, capacity, measurement, R225.
 Collections, radio, R080.
 Colpitts circuit, R133.
 Commercial and special services (radio), R530.
 Communication, radio, R000.
 Communication, radio systems, R400.
 Comparison method, signal intensity, audio-frequency, R272.
 Comparison method, signal intensity, radio-frequency, R273.
 Compass radio (application in navigation), R514.
 Complex variables (mathematics), 512.82.
 Condenser antennas, R322.
 Condenser antennas (principles), R122.
 Condenser transmitters, 621.385.95.
 Condensers, R381.
 Condensite, R281.21.
 Condensite celoron, R281.11.
 Condensite resin, R281.65.
 Conductors, properties, R284.
 Constants, antenna (principles), R127.
 Construction of electron tubes, R331.
 Contact detectors, R364.
 Continental code, R531.4.
 Continuous-wave systems, R420.
 Contracts, radio, R003.
 Contracts, radio manufacturing, R700.3.
 Contracts, station operation, R620.3.
 Control, distant, by radio, R570.
 Control, remote (by wire), R440.
 Control, station operation, R620.65.
 Converters, arc, R353.
 Converters, frequency, R357.
 Coolidge tubes, 621.327.7.
 Copper, properties, R284.11.
 Corbino effect, 537.62.
 Corona discharge, 537.26.
 Costs of radio manufacturing, R700.2.
 Costs of station operation, R620.2.
 Cotton, R281.41.
 Counterpoise antennas, R322.
 Counterpoise antennas (principles), R122.
 Coupled circuits, principles, R142.
 Couplers, R382.5.
 Coupling, capacitive (general principles), R142.5.
 Coupling, direct (general principles), R142.1.
 Coupling, inductive (general principles), R142.3.
 Courses of study, radio, R071.
 Crystal detectors, R364.
 Current measurement, R250.
 Current transformer, radio, R251.3.
- D.**
- Daily variations (of radio signals), R113.2.
 Damping, radio circuits, R143.
 Decrement, measurement, R240.
 Decrement, radio circuits, R143.
 Decremeters, R384.5.
 Descriptive geometry, 515.
 Design, electron tubes (principles), R130.4.
 Design of electron tubes, R330.4.
 Design of radio apparatus, R300.4.
 Design, radio, R004.
 Detector action of electron tubes, R124.
 Detectors, crystal, R374.
 Detectors, crystal, practical forms, R374.2.
 Detectors, crystal, theory, R374.1.
 Detectors, electron-tube, R341.
 Detectors, electron-tube (principles), R134.
 Detectors, miscellaneous, R375.
 Developments, national radio, R590.
 Dielectric constant, measurements, R223.
 Dielectric constants of materials, R281.
 Dielectric power loss (measurement), R240.
 Dielectric power loss (properties of materials), R281.
 Diffraction, radio waves, R113.6.
 Diode, R332.
 Direct coupling (general principles), R142.1.
 Direct-current machinery, 621.313.2.
 Directional properties (radio waves), R115.
 Directional variations (radio waves), R113.3.
 Direction finders, R325.1.
 Direction finding on aircraft, R521.1.
 Direction finding (principles), R125.1.
 Directive antennas, R325.6.
 Directive antennas (principles), R125.6.
 Direction-finding stations, R614.
 Discharger. (*See* Spark gap.)

Distant control by radio, R570.
 Distortion in modulation, principles, R148.1.
 Distress signals, radio, R511.
 Doublers, frequency, R357.
 Drafting, radio factories, R711.
 Drawings, radio manufacturing, R700.4.
 Drawings, station operation, R620.4.
 Dummy antennas, R328.
 Duo-lateral inductance coils, R382.4.
 Duplex systems, R460.
 Dynamotors, 621.313.26.
 Dynatron, R334.

E.

Earth antennas, R323.
 Earth antennas (principles), R123.
 Earth connections, R326.
 Eclipses, effect on radio transmission, R113.8.
 Education, radio, R070.
 Einthoven galvanometer, R251.5.
 Einthoven galvanometer (recording device), R377.
 Electrical engineering, 621.3.
 Electrical properties of insulating material, R281.
 Electrical communication, 621.38.
 Electricity, 537.
 Electricity, theory of, 537.1.
 Electrodynamics, 537.6.
 Electrodynamometer, radio, R251.4.
 Electrodynamometers, 621.374.63.
 Electrolytes, properties, R282.
 Electrolytic detectors, R375.3.
 Electromagnetic theory, R111.
 Electromagnetic recorder, R377.3.
 Electrometers, 621.374.33.
 Electron emission, R138.
 Electron-tube amplifiers, R342.
 Electron-tube apparatus, R340.
 Electron-tube communication systems (preferably use other more specific entires), R423.
 Electron-tube detectors, R341.
 Electron-tube generators, R344.
 Electron-tube generators, short wave, R344.4.
 Electron-tube generators with a. c. supply, R344.5.
 Electron-tube harmonic generators, R344.7.
 Electron-tube large-current generators, R344.6.

Electron-tube modulators, R345.
 Electron-tube receiving sets, R343.
 Electron-tube rectifiers, R341.
 Electron-tube transmitting sets, R344.3.
 Electron-tube voltmeters, R261.
 Electron tubes, R330.
 Electron tubes, construction, R331.
 Electron tubes, four-electrode, R334.
 Electron tubes, history, R330.9.
 Electron tubes (principles), R130.
 Electron tubes, three-electrode, R333.
 Electron tubes, two-electrode, R332.
 Electron tubes, uses in radio measurements, R201.2.
 Electron tubes, use in wire communication, R348.
 Electrostatic generators, 537.23.
 Electrostatic voltmeters, R263.
 Elevated antennas, with counterpoise, R322.
 Elevated antennas, with counterpoise (principles), R122.
 Elevated antennas with ground, R321.
 Elevated antennas, with ground (principles), R121.
 Elimination of interference, R430.
 Elimination of magneto interference on aircraft, R521.3.
 Engineering precautions, radio, R300.5.
 England, radio developments, R592.
 Equipment of radio stations, R610.
 Equipment, radio, R300.
 Equipment, radio manufacturing, R701.
 Evacuation of electron tubes, R331.
 Excitation, impulse, systems, R425.
 Executive, radio, R005.
 Executive, radio manufacturing, R700.5.
 Executive, station operation, R620.5.
 Exhibitions of radio apparatus, R306.

F.

Fading (of radio signals), R113.1.
 Factories, location, R710.1.
 Factories, radio, R710.
 Fibre, insulation, R281.13.
 Fields, electrical, experimental plotting of, 537.67.
 Filters (radio circuit), R386.
 Filters, radio (principles), R145.
 Floraphone, R495.
 Fog signaling, R513.
 Forestry, use of radio in, R535.
 Formica, R281.11.

Formulas, transmission, R113.7.
 Four-electrode electron tubes, R334.
 Frame antennas, R324.
 France, radio developments, R593.
 France, radio laws and regulations, R007.6.
 Freak transmission, R113.
 Frequency. (*See also* Wave length.)
 Frequency changers, R357.
 Frequency, measurement, R210.
 Frequency, meters, R384.3.
 Frequency, of simple radio circuits, R141.1.
 Fullerphone, R492.
 Furnaces, high-frequency, R584.

G.

Galena detector, R364.
 Galvanometer, Einthoven, R251.5.
 Galvanometers, 621.374.45.
 Gaps, spark, R352.
 Gaps, spark (principles), R152.
 Gaps, spark, voltage measurement by R262.
 Generating action of electron tubes, R133.
 Generating apparatus, R350.
 Generating apparatus (principles), R150.
 Generators, direct-current, 621.313.23.
 Generators, (dynamos), 621.313.
 Generators, electron-tube, R344.
 Generators, electron-tube (principles), R133.
 Generators, high-voltage, R355.
 Geology, 550.
 Geometry, 513.
 Geometry, analytic, 516.
 Geometry, descriptive, 515.
 Germany, radio developments, R594.
 Germany, radio laws and regulations, R007.7.
 Glass, R281.33.
 Goldschmidt alternators, R354.
 Goniometer, radio, R325.
 Goniometry, radio, R125.1.
 Granite, R281.73.
 Graphical methods, 516.12.
 Great Britain, radio developments, R592.
 Great Britain, radio laws and regulations, R007.5.
 Grid leak, R383.1.
 Ground antennas, R323.
 Ground antennas (principles), R123.
 Ground connections, antennas, R326.

Ground connections, principles, R126.
 Grounding in radio measurements, R201.5.
 Grounds (radio circuit), R387.5.
 Ground telegraphy, 621.382.92.
 Guided-wave telephony, R470.
 Gutta-percha, R281.37.

H.

Harmonic analysis, 537.7.
 Harmonic generators, electron-tube, R344.7.
 Harmonic methods in radio measurements, R203.
 Harmonic methods of measuring frequency or wave length, R213.
 Harmonics, radio (general principles), R146.
 Hartley circuit, R133.
 Heat, 536.
 Heaviside layer, R113.4.
 Height, effective, antenna (principles), R127.
 Helmets for telephone receivers (aircraft), R522.
 Hertzian oscillators, R351.
 Heterodyne action (principles), R147.
 Heterodyne action of electron tubes, R134.7.
 Heterodyne receiving sets, R343.5.
 Heterodyne reception systems, R426.
 High frequency. (*See* Radio.)
 High-frequency alternators, R354.
 High-frequency alternator systems, R422.
 High-frequency current measurement, R250.
 High-frequency electric furnaces, R583.
 High-frequency modulating systems, R414.
 High-frequency resistance, R144.
 High-frequency wire telephony, R470.
 High-power radio stations (*see also* R401), R611.
 High-power radio systems, R401.
 High-speed radio systems, R485.
 High-speed recorders, R377.
 High-speed telegraphy, 621.382.4.
 High-speed transmitters, R359.
 High-voltage generators, R355.
 History of electron tubes, R330.9.
 History, radio, R090.
 Honeycomb coils, R382.4.
 Hot-wire ammeters, R251.1.

Hoxie recorders, R377.
 Humor, radio, R083.
 Hydrostatics, 532.
 Hysteresis, dielectric (measurement), R240.
 Hysteresis, dielectric (principles), R145.5.
 Hysteresis, magnetic (principles), 538.
 Hysteresis, magnetic (properties of materials), R283.

I.

Imaginaries (mathematics), 512.82.
 Impact excitation systems, R425.
 Impedance, input, of electron tubes, R136.
 Impedance, output, of electron tubes, R137.
 Impulse excitation, of simple radio circuits, R141.3.
 Impulse excitation systems, R425.
 Incandescent filament lamps, 621.326.
 Incendiary radio, R300.5.
 Inductance coils, capacity of, measurement, R225.
 Inductance, measurement, R230.
 Inductance, mutual, measurement, R235.
 Inductance, of antennas (principles), R127.
 Inductance, radio circuits (principles), R145.3.
 Inductance, self, measurement, R231.
 Induction coils, 621.314.7.
 Induction coils (radio transmitting), R356.5.
 Induction signaling, 621.382.94.
 Inductive coupling (general principles), R142.3.
 Inductive coupling, amplifying action, R132.1.
 Inductive coupling, amplifiers, R342.1.
 Inductive disturbances in power supply to radio generating sets, R300.6.
 Inductors, R382.
 Infra-red signaling, 623.731.
 Input impedance of electron tubes, R136.
 Installation in radio stations, R620.8.
 Instruments, radio, R380.
 Insulating materials, R281.
 Insulation, properties of materials, R281.
 Insulators, R387.7.
 Intensity, signal, measurement, R270.
 Interference elimination, R430.

Interference, magneto (aircraft), R521.3.
 International conferences, R007.9.
 Interrupters, R385.3.
 Interrupters, receiving, use of, R427.
 Ionic tubes. (*See* Electron tubes.)
 Ionization, atmospheric (radio transmission), R113.4.
 Ionization in electron tubes, R138.
 Iron, properties, R283.

J.

Jamming (interference), R432.
 Jet relay, R377.2.
 Johnsen-Rahbek phenomenon, 537.66.

K.

Kenotron, R332.
 Keys, automatic, R359.
 Keys, transmitting, R385.1.
 Kick-back prevention, R300.6.

L.

Laboratories, radio, R307.
 Laborers, radio factories, R710.5.
 Lacquers, R281.47.
 Laminated insulating materials, R281.1.
 Lava, R281.75.
 Landing signals, localized, R524.3.
 Land lines, relations with, R531.5.
 Lantern slides, R040.
 Large-current electron-tube generators, R344.6.
 Laws, radio, R007.
 Lectures, radio, R040.
 Legislation, radio, R007.
 Leyden jars. (*See* Condensers.)
 Life-saving service, application to, R516.
 Light, 535.
 Lightning, 537.4.
 Light signals, 623.731.
 Line radio, R470.
 Linkage, R450.
 Lissajous figures (radio), R201.7.
 Localized landing signals, R524.3.
 Logarithmic decrement, R143.
 Longitude determinations by radio, R551.1.
 Long-wave communication systems, R401.
 Long-wave stations, R611.
 Loop antennas (principles), R124.
 Losses, antenna, R127.
 Loud-speaking reproducers, R376.3.
 Low-frequency modulating systems, R413.
 Low-power stations (*see also* R402), R612.

M.

Machine shop, radio factories, R713.
 Machines, radio manufacturing, R701.4.
 Magnavox, R376.3.
 Magnetic amplifiers, R373.1.
 Magnetic detectors, R375.1.
 Magnetic materials, properties, R283.
 Magnetism, 538.
 Magneto interference, elimination on aircraft, R521.3.
 Maintenance of radio stations, R620.6.
 Maintenance, radio, manufacturing, R700.6.
 Management of radio stations, R620.
 Manufacturing, radio, R700.
 Maps, R084.
 Marble, R281.71.
 Market reports, R556.
 Masts, R320.8.
 Materials, properties of, R280.
 Materials, radio manufacturing, R701.
 Mathematics, 510.
 Measurements, radio, R200.
 Mechanical engineering, 621.
 Mechanics, 531.
 Mechanics, radio factories, R710.5.
 Meetings, R060.
 Medicine, application to, R583.
 Meissner circuit, R133.
 Mercury vapor rectifiers, 621.313.73.
 Mercury vapor tubes (lamps), 621.327.4.
 Metals, properties, R284.1.
 Meteorological signals, R552.
 Meteorological (transmission phenomena), R113.5.
 Meteorology, 551.5.
 Meters, audibility, R378.
 Mica, R281.38.
 Mica, built-up, R281.383.
 Microphone amplifiers, R373.2.
 Microphones, R385.5.
 Microphones for aircraft design, R522.3.
 Military, applications of radio, R560.
 Mining, use of radio in, R536.
 Miscellanies, radio, R080.
 Modulated wave systems, R410.
 Modulating action of electron tubes (principles), R135.
 Modulating systems, high - frequency, R414.
 Modulating systems, low - frequency, R413.

Modulating systems, radio-telephone, R412.
 Modulation, measurement, R275.
 Modulation, radio (general principles), R148.
 Modulators, electron-tube, R345.
 Modulators, electron-tube (principles), R135.
 Molecular physics, 539.
 Molybdenite detector, R374.
 Morse code, R531.4.
 Motor generators, 621.313.25.
 Motors, direct-current, 621.313.24.
 Motors, electric, 621.313.
 Moulded insulating materials, R281.2.
 Multiplex systems, R460.
 Multivibrators, R344.7.
 Multivibrators (principles), R133.
 Multivibrators, use in wave-length standardization, R213.
 Mutual inductance, measurements, R235.

N.

National developments, radio, R590.
 Naval applications of radio, R565.
 Navigation, applications of radio to, R510.
 Navigation, sound signals in, 534.83.
 Negative resistance, 537.61.
 Negative resistance, principles (electron tubes), R132.
 Nomenclature, electron tubes, R130.3.
 Nomenclature, radio, R030.
 Nomograms, radio, R082.
 Nomograms for particular computations. (Classify under subject covered.)
 Nomography, 516.12.
 Nonsynchronous rotary gaps, R352.6.
 Nonsynchronous rotary spark systems, R411.6.
 Null methods in radio measurements, R204.

O.

Oil, R281.49.
 Operating routine, R620.64.
 Operation of radio stations, R620.
 Operation, radio manufacturing, R700.6.
 Organization, radio factories, R710.4.
 Oscillation constant, R145.
 Oscillators, simple radio, R351.
 Oscillatory circuits, R140.
 Oscillation transformers, R382.5.
 Oscillions, R330.

Oscillograph, cathode-ray, construction, R388.
 Oscillograph, cathode-ray, uses, R201.7.
 Oscillograph, high-frequency, use of, R201.7.
 Oscillographs, 621.374.7.
 Output impedance of electron tubes, R137.
 Oxide coatings (insulating materials), R281.81.

P.

Paper, R281.42.
 Paraffin, R281.46.
 Parts of radio circuits, R380.
 Patent practice, 347.7.
 Patent specifications, radio, R008.
 (These should ordinarily be distributed according to the subject of the patents.)
 Perikon crystal detector, R374.
 Periodicals, R053.
 Personnel for station operation, R620.64.
 Personnel, radio, R005.
 Phase difference, measurement, R240.
 Phase difference (properties of materials), R281.
 Phenolic binders, laminated insulating materials, R281.11.
 Phenolic binders, moulded insulating materials, R281.21.
 Phenol-methylene type insulating materials, laminated, R281.11.
 Phenol-methylene type insulating materials, moulded, R281.21.
 Phonograph recorder, R377.5.
 Photoelectric phenomena, 535.3.
 Photographic recorder, R377.1.
 Photographs of radio apparatus, R305.
 Photographs, transmission of, by radio, R582.
 Physical chemistry, 541.3.
 Physics, 530.
 Physiological electrical phenomena, 537.87.
 Piezoelectric phenomena, 537.65.
 Pitch, R281.45.
 Pitch binders, moulded insulating materials, R281.23.
 Electrons, 537.65.
 Plotrons, R330.
 Plotting of electrical fields, 537.67.
 Pneumatics, 533.
 Polygraphy, R080.
 Porcelain, R281.31.

Portaphone, R343.
 Postal service, 383.
 Power amplifiers, R342.5.
 Power loss, radio, measurement, R240.
 Power transmission by radio, R581.
 Power transmission, use of radio communication in, R537.
 Power transmission lines, 621.319.2.
 Precautions, engineering (radio), R300.5.
 Pressboard, R281.42.
 Press, radio traffic, R532.
 Primary batteries, 621.353.
 Primary standards. (Classify under appropriate item in radio measurements and standardization.)
 Principles, radio, R100.
 Printing recorder, automatic, R377.6.
 Private applications of radio, R540.
 Probabilities, 519.
 Process, radio manufacturing, R720.
 Programs for research, R010.
 Properties of electron tubes, general, R131.
 Properties of materials, R280.
 Protective devices (radio), R358.
 Publication, radio, R050.
 Pulpboard, R281.426.
 Pumps, vacuum, 533.85.
 Pyrites detectors, R374.
 Pyroelectric conductors, R284.3.

Q.

Quartz, R281.71.
 Quenched spark gaps, R352.2.
 Quenched spark systems, R411.2.

R.

Radiation of heat, general theory, 536.33.
 Radiation (of radio waves), R112.1.
 Radioactivity, 546.432.
 Radio and wire systems, linkage of, R450.
 Radio, applications of, R500.
 Radio beacons, R512.
 Radio circuits, R140.
 Radio communication, R000.
 Radio communication systems, R400.
 Radio compass (application in navigation), R514.
 Radio-frequency amplifiers, R342.6.
 Radio manufacturing, R700.
 Radio principles, R100.
 Radio research programs, R010.
 Radio stations: Equipment, operation, management, R600.

- Radio telegraphy, history, R091.
 Radio telephone sets, electron-tube, R346.
 Radio telephone systems, R412.
 Radio telephony, history, R094.
 Radio telephony on aircraft, R520.3.
 Radio toys, R585.
 Radiodynamics, R570.
 Radiogoniometer, R325.
 Railroads, use of radio by, R533.
 Range of transmission, R113.7.
 Rates, radio, R531.7.
 Raw materials, radio manufacturing, R701.2.
 Reactance, radio circuits (principles), R145.
 Reactance-variation method of measurement, R241.
 Receivers, telephone, R376.
 Receiving apparatus, R370.
 Receiving apparatus (principles), R160.
 Receiving from aircraft, R523.
 Receiving interrupters, use of, R427.
 Receiving on aircraft, R521.
 Receiving sets, R360.
 Receiving sets, electron-tube, R343.
 Receiving sets, heterodyne, R343.5.
 Reception (of electric waves), R112.6.
 Recorders, automatic, R377.
 Rectification, radio (general principles), R149.
 Rectifiers, 621.313.7.
 Rectifiers, electron-tube, R341.
 Rectifiers, miscellaneous, R375.
 Redmanol, R281.65.
 Reflection, radio waves, R113.6.
 Refraction, radio waves, R113.6.
 Regenerative action, R134.4.
 Regenerative circuits (electron tubes), R134.
 Regulation, station operation, R620.64.
 Regulations, radio, R007.
 Regulations, radio manufacturing, R700.7.
 Regulations, station operation, R620.7.
 Regulator tubes, R332.3.
 Relay communication systems, R480.
 Relay, electron, R330.
 Relays, electron-tube, used in wire communication, R348.
 Relays, telegraph, 621.383.21.
 Relations with cables, R531.6.
 Relations with land lines, R531.5.
 Remote control systems (by wire), R440.
 Renewals, radio manufacturing, R700.69.
 Renewals, station maintenance, R620.69.
 Repairs, radio manufacturing, R700.69.
 Repairs, station maintenance, R620.69.
 Repeaters, electron-tube, used in wire communication, R348.
 Reports of radio stations, R620.9.
 Reports, radio, R009.
 Research, radio, R010.
 Resins, R281.60.
 Resins, natural, R281.61.
 Resins, synthetic, R281.65.
 Resistance coupling, amplifiers, R342.2.
 Resistance coupling, amplifying action, R132.3.
 Resistance, high-frequency (principles), R144.
 Resistance, measurement, R240.
 Resistance, negative, 537.61.
 Resistance of antennas (principles), R127.
 Resistance-variation method of measurement, R241.
 Resistors, R383.
 Resonance, general principles, R140.
 Resonance, in simple radio circuits, R141.2.
 Resonance, methods in radio measurements, R202.
 Resonance methods of measuring frequency or wave length, R211.
 Resonance transformers, R356.3.
 Rheostats, 621.317.4.
 Rotary, nonsynchronous spark systems, R411.6.
 Rotary, spark gaps, nonsynchronous, R352.6.
 Rotary, spark gaps, synchronous, R352.4.
 Rotary, synchronous spark systems, R411.4.
 Rubber, R281.35.
 Rules, radio manufacturing, R700.7.
 Rules, station operation, R620.7.
- S.**
- Safety, radio, R300.5.
 Sales, radio manufacturing, R740.
 Schools, radio, R070.
 Seasonal variations (of radio signals) R113.2.
 Secondary batteries, 621.354.
 Secondary standards. (Classify under appropriate item in radio measurements and standardization.)
 Secrecy systems, R435.

- Selectivity of receiving sets, R162.
 - Self-inductance, measurement, R231.
 - Sensitivity of receiving sets, R161.
 - Service, commercial radio, R530.
 - Shellac, R281.48.
 - Shellac binders, laminated insulating materials, R281.12.
 - Shellac binders, moulded insulating materials, R281.22.
 - Shielding in radio measurements, R201.5.
 - Shields (radio circuit), R387.1.
 - Ship stations, R613.
 - Short-wave electron-tube generators, R344.4.
 - Short-wave radio systems, R402.
 - Short-wave stations, R612.
 - Shunted telephone method, signal intensity, R271.
 - Signal Corps Radio Service, R560.
 - Signal intensity, measurement, R270.
 - Silicon detector, R374.
 - Silk, R281.41.
 - Simple oscillators, R351.
 - Simple radio circuits, R141.
 - Skin effect (high-frequency resistance), R144.
 - Slate, R281.74.
 - Slide rules, 510.8.
 - Societies, R060.
 - Sound, 534.
 - Sound (*see also* Signal intensity measurement), R270.
 - Spacing wave, R422.1.
 - Spark gaps, R352.
 - Spark gaps (principles), R152.
 - Spark systems, R411.
 - Spark, timed, R352.8.
 - Spark, timed, systems, R424.
 - Spark transmitting sets, kick-back prevention, R300.6.
 - Sparkling distance, voltage, R262.
 - Special service (radio), R530.
 - Speech distortion, principles, R148.1.
 - Speech transmission, radio, R412.
 - Speed, code reception, R531.15.
 - Spiderweb coils, R382.6.
 - Specific inductive capacity. (*See* Dielectric constant.)
 - Standardization, radio, R200.
 - Standard waves, transmission of, R555.
 - Standards, Bureau of, 353.821.
 - Static (radio transmission), R114.
 - Static, elimination of, R431.
 - Static machines, 537.23.
 - Station call letters, R531.2.
 - Station descriptions, R610.
 - Station interference, R432.
 - Stations, high-power (*see also* R401), R611.
 - Stations, low-power (*see also* R402), R612.
 - Stations, remote control, R440.
 - Stationary waves on wires, R116.
 - Statistics of station operation, R620.1.
 - Statistics on radio manufacturing, R700.1.
 - Statistics, radio, R001.
 - Steamships, 623.8.
 - Stockrooms, radio, R308.
 - Storage batteries, 621.354.
 - Strays (radio transmission), R114.
 - Strays, elimination of, R431.
 - Strength of signals, measurement, R270.
 - Submarine cable telegraphy, 621.382.8.
 - Submarine radio communication, R515.
 - Submarine sound signals, 534.83.
 - Submerged antennas, R323.
 - Submerged antennas (principles), R123.
 - Substitution method of measuring resistance, R243.
 - Substitution methods in radio measurements, R205.
 - Sulphur, R281.77.
 - Superheterodyne, R134.75.
 - Superregenerative action, R134.45.
 - Swinging (of radio signals), R113.1.
 - Switchboards, 621.317.
 - Switches, 621.317.3.
 - Switches, antenna, R320.6.
 - Symbols, radio, R030.
 - Synchronous rotary caps, R352.4.
 - Synchronous rotary spark systems, R411.4.
 - Systems of radio communication, R400.
 - Systems, secrecy, R435.
- T.
- Tables, radio, R081.
 - Taste, reception by, R490.
 - Telegraphone, 621.385.91.
 - Telegraphone recorder, R377.4.
 - Telegraphy, 621.382.
 - Telegraphy, high-speed, 621.382.4.
 - Telegraphy, radio, R000.
 - Telegraphy, wire, use of electron tubes in, R348.
 - Telephone, radio, electron-tube sets R346.
 - Telephone receivers, R376.

- Telephone receivers, loud-speaking, R376.3.
 Telephone receivers, tuned, R376.2.
 Telephone systems, radio, R412.
 Telephony, 621.385.
 Telephony, radio, R000.
 Telephony, wire, use of electron tubes in, R348.
 Terminology, radio, R030.
 Tesla coils, 621.314.7.
 Testing. (Index under apparatus tested.)
 Testing, station operation, R620.68.
 Textbooks, radio, R020.
 Textiles, R281.41.
 Therapeutics, radio, R583.
 Thermal ammeters (hot-wire), R251.1
 Thermoelement, R251.2.
 Thermogalvanometers, R251.2.
 Thermophones, 621.385.93.
 Three-electrode electron tubes, R333.
 Tikkers, R385.3.
 Timed spark, R352.8.
 Timed spark systems, R424.
 Time signals, R551.
 Tone wheels, R385.3.
 Tone wheels, use of, R427.
 Tools, radio manufacturing, R701.4.
 Towers, R320.8.
 Toys, radio, R585.
 Traffic (radio), R531.
 Training, R070.
 Training of operators, R073.
 Trains of damped waves, R143.
 Transformer, radio current, R251.3.
 Transformers, 621.314.3.
 Transformers for electron-tube amplifiers, R342.7.
 Transformers, oscillation, R382.5.
 Transformers (radio transmitting), R356.
 Transformers, radio transmitting (principles), R156.
 Transformers, resonance, R356.3.
 Transmission formulas, radio, R113.7.
 Transmission lines, 621.319.2.
 Transmission of photographs by radio R582.
 Transmission of power by radio, R581.
 Transmission phenomena, R113.
 Transmission, remote control, R440.
 Transmitters, automatic, R359.
 Transmitters, condenser, 621.385.95.
 Transmitting from aircraft, R522.
 Transmitting sets, R350.
 Transmitting sets, arc, R353.
 Transmitting sets, electron-tube, R344.3.
 Transmitting sets, radio telephone, electron-tube, R346.
 Transmitting sets, spark, R352.
 Transmitting to aircraft, R524.
 Transoceanic communication, R401.
 Tree telegraphy, R495.
 Triangulation, radio (principles), R125.1.
 Triangulation, radio (*see also* Applications to navigation), R510.
 Trigonometry, 514.
 Triodes, R330.
 Triodes. (*See* Electron tubes.)
 Tropical radio, R113.55.
 Tubes, electron, R330.
 Tubes, electron (principles), R130.
 Tuned telephone receivers, R376.2.
 Tuners, R382.5.
 Tungsten, R284.13.
 Tuning, general principles, R140.
 Tuning forks, 534.3.
 Two-electrode electron tubes, R332.

U.

- Ultra-violet signaling, 623.731.
 Undamped wave systems, R420.
 Underground antennas, R323.
 Underground antennas (principles), R123.
 Underwater antennas, R323.
 Underwater antennas (principles), R123.
 United States, radio development, R591.
 United States laws and regulations, R007.1.
 United States radio inspection service, R007.2.

V.

- Vacuum apparatus, 533.85.
 Vacuum tubes, R330.
 Valves (electron tubes), R330.
 Variations, daily (of radio signals), R113.2.
 Variations (directional) (of radio signals), R113.3.
 Variations, seasonal (of radio signals), R113.2.
 Variometer, R382.
 Varnish, R281.47.
 Vibration galvanometers, 621.374.45.
 Violet-ray coils, 621.314.7.
 Visual signaling, 623.731.
 Vitriified-clay products, R281.82.
 Voltage, measurement, R260.
 Voltage, sparking, R262.

Voltmeters, 621.374.3.
 Voltmeters, electron-tube, R261.
 Voltmeters, electrostatic, R263.
 Voltmeters, for radio frequencies, R260.

W.

Wattmeters, 621.374.6.
 Wave form analysis, 537.7.
 Wave front angle, R113.9.
 Wave length, antenna (principles), R127.
 Wave length assignment (law), R007.
 Wave length, measurement, R210.
 Wave trains, damped, R143.
 Waves on wires, R116.
 Waves, radio, R110.
 Waves, standard, transmission of, R555.
 Wavemeters, R384.1.
 Wax, R281.44.
 Weather, 551.5.

Weather (radio transmission), R113.5.
 Weather signals, R553.
 Wheatstone bridges, 621.374.2.
 Wire and radio systems, linkage of, R450.
 Wire communication, use of electron tubes in, R348.
 Wire tables, copper, R284.11.
 Wired radio, R470.
 Wireless. (*See* Radio.)
 Wires, ground, R323.
 Wires, ground (antennas), R123.
 Wires, waves on, R116.
 Wood, R281.43.
 Woodworking shop, radio factories, R712.
 Working of radio stations, R620.6.

X.

X-ray tubes, 621.327.7.
 X's (radio transmission), R114.
 X's, elimination of, R430.

Washington, November 28, 1922.



